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ABSTRACT

Selecting from a wide variety of sources, this report presents instructional techniques for the remediation of letter reversal errors in young students' writing. The techniques in the report have been applied in classrooms and found to be successful with a great majority of students. Sections of the report include: (1) an introduction; (2) definitions; (3) "Try These Steps First"; (4) "What Can Be Done?" (5) "Modern Letter Formation Strategies"; (6) "Several Examples from Applied Behavior Analysis"; and (7) "Common Error Profile." The report states that the techniques are easy to use, require only readily available and inexpensive materials, and are not time consuming if applied in short sessions daily. The report recommends that a consistent, systematic, positive reinforcement procedure always be an integral part of the techniques. (Twenty-seven references are attached.) (RS)

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PRACTICAL TECHNIQUES FOR THE REMEDIATION OF REVERSAL ERRORS

prepared by

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PREFACE

Reading letters backward, upside down, or out of order in words is a common occurrence among beginning readers. Similar difficulties occur in writing letters and numbers, and in spelling.

Preschool children typically write their "new" letters and numbers in a variety of orientations. However, with experience in writing, and reading, such errors rapidly disappear.

For example, it is usual to find that in the spring of the kindergarten year 75% of students make one, two, three, or more reversal errors. However, by the spring of first grade, only 25% of students do so. Such errors are increasingly uncommon in second and third grade.

A variety of theories have been proposed to explain why children make these types of errors. The modern, and most widely accepted, point of view is that they are the product of inexperience with directionality, with left/right or top/bottom orientation.

Why then do some older children continue to make these kinds of errors despite the teacher's efforts to prevent them? Three explanations are given.

First, some children require more training, and use of individualized methods.

Second, habits of incorrect reading, writing, or spelling develop early and can be difficult to change.

Third, the judgments the students are required to make are sometimes difficult. They involve very similar forms (u/n) or those that make another acceptable form when turned or shifted (tip/pit).

The techniques presented in this report <u>will</u> <u>succeed</u> in the remediation of reversal errors. Even so, some may work better with one student than another, and some may be more relevant to certain grade levels than others. Become familiar with all of them and then put together a "package" for your problem learner.

Good Luck!

I. INTRODUCTION

These procedures have been selected from a wide variety of sources. They all have been applied in classrooms and reported as successful with the greater majority of students with whom they have been used. Teachers have reported that:

(a) systematic, planned use
(b) allowing reasonable time for effects to show
(c) trying other of these methods if the first ones chosen are not successful, or use of several methods at once
(d) follow-up, re-do as needed

Are key ingredients in producing success.

II. DEFINITIONS

Reversal	b for d, ⅂ for 7, qat for pat
Inversion	pig for big, min for win, oʌer for over
Transposition	was for saw, no for on, nat for ant
Rotation	u for c, ω for 3, tϖn for ten
Mirroring	llid ϱdt nϱ for on the hill

Various combinations of these errors are possible.

III. TRY THESE STEPS FIRST

(1) Determine the kinds of errors made.
(2) Compare student's error to what is typical for the age and grade.
(3) Take a frequency count. For example, over a one week period tally the number of errors made.
(4) If appropriate, tally the number of different letters, numbers, or words that are problems.
(5) Count the number of times they could be. Examples: John read was for saw 4/15 times = 27%; Judy wrote p for d 7/8 times = 88%.

This information determines the extent of the problem, and provides the basis for remediation. Also, it is not uncommon to find a more limited problem than thought when looked at in this way.

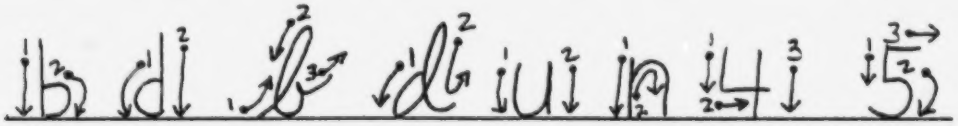
IV. WHAT CAN BE DONE?

CLUES TO FORMATION

Principle: Specific, concrete, action-oriented descriptions of how to make letters or numbers are necessary for some students. It is best if they are available for constant reference by student, or if can be memorized.

1. Physically guide the student's hand and verbalize the action (formation rule) as you form the problem letter or number. Gradually fade this prompt by exerting less and less pressure. An example of a formation rule is, "Down, up, right around - that's a b". Have student say this aloud while writing.

2. Have an alphabet or number strip on the desk so reference to it can be made. Or, a direction chart for letter or number formation, perhaps consisting only of problem letters or numbers. Example:



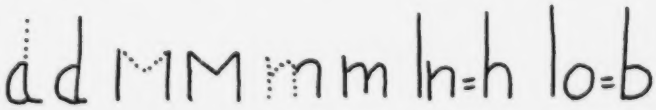
3. Use a line and a half circle and show how with these 2 objects 5 letters could be made (p, q, d, b, g). Emphasize differences with short statements like, "Stick before down, it's p".

4. Verbalize to the student the sequence to follow. For example: For the b teach, "Line top to bottom, up halfway, half circle right"; for the m teach, "Half line down, hill, hill". Teach as a rhythmic chant to aid memory.

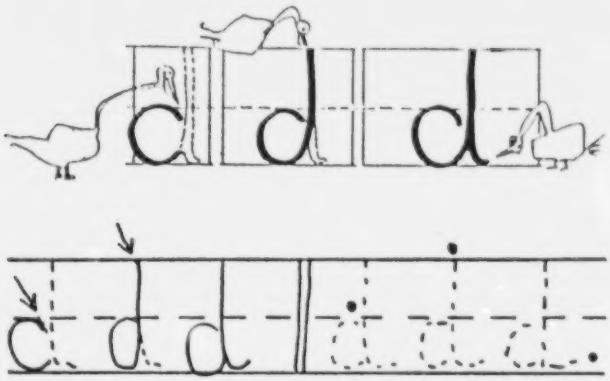
5. Show the child that the letter or number contains something else. For example, remind the child that a B has the little b in it. If writing the b have the child remember to visually make the b a B. If it can be done it is correct. If not, chances are the letter is a d. Use this example:

Other examples:

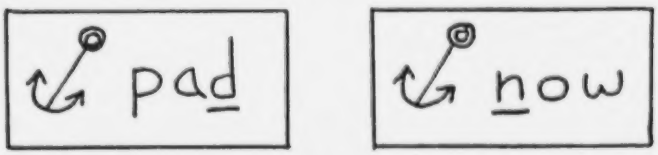
d has an a in it
M has a v in it
m has an n in it
h = l + n
b = l + o



6. Accentuate starting points for formation. Use arrows, dots, "pointer birds", etc.[1] Gradually fade cues. Examples:



7. Write on cards words the student knows (such as bed, pad, won, peg) and which contain the problem letters. Keep at student's desk. Student can then refer to (and memorize) these as aids for correct letter formation. They serve as anchor words:



8. Have students memorize phrases like the following for each problem letter: "It starts like a c which comes before d", or, "Loop left and line, like mine!" (i.e, a d).

9. Students can practice exact formation by use of stencils, tracing paper, plastic letters, templates. For example, have student make a few perfect letters before writing lesson.

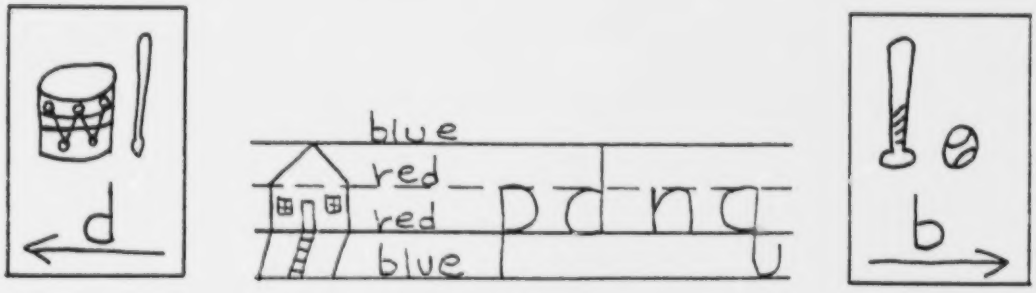
The idea here is errorless learning. That is, the assignment is set up so that the student cannot make the letter or number incorrectly.

error learning: Once done, errors tend to be repeated and soon become well established. Random reversal errors are acceptable, consistent errors are not.

If the student is making consistent errors, drop back to several days of allowing only exact formation. Then gradually allow freedom to error by, for example, having student write over rows of correct letters covered with a tissue paper. Gradually add more layers of these to make the underlying models fainter and fainter.

10. "Four points of orientation":[2] Top, Bottom, Left, Right.

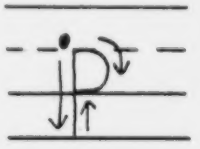
Make writing pages and large posters thus:



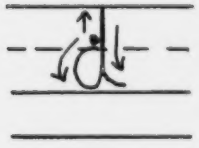
The red lines are the "little red house".
The top blue line is "upstairs".
The bottom blue line is "downstairs".
"Drum and stick" are Left, "bat and ball" are Right.

Put the drum poster on the extreme left of front wall, and put the bat poster on the extreme right of front wall.

Based on this formatting of the writing page, and the poster cues, rules for letter formation can be devised. For example:



p starts in the "little red house", goes "downstairs", up the stairs again, and turns to the "bat and ball".



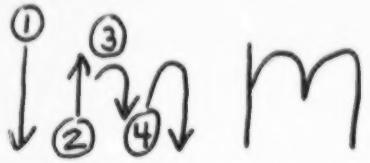
d starts "upstairs", goes into the "little red house", and turns to the "drum and stick".

11. If the learner is having trouble following or remembering the letter or number formation sequence, try reteaching using a chaining procedure: Chaining links the steps in a behavioral sequence.

Error: Student writes w for m.

Example:

(a) Teach the formation of m using an overhead projector. There are four steps:



(b) Use this diagram as a visual aide. In addition use a tell prompt, show prompt, and guide prompt for each step.

(c) Use verbal reinforcement when student successfully links each step to the proceeding one. Emphasize to the student that this linking is the most important part of learning to write.

(d) Begin each new step by reviewing those previously taught. For example, review steps (1) and (2) before adding (3).

(e) Make sure that when the student is able to correctly produce the sequence (the "full chain") it is effectively reinforced.

For example, make a list of what the student likes and use these as reinforcers. Examples could be a special sticker, a special smile, or a special friend to share the skill with. Do this as often as possible during the day, for several days. Use intermittent reinforcement thereafter: for some, but not all, correct chains.

Remember to always combine praise (nice, good) with description (perfect chain, correct m), when giving verbal reinforcement.

tell prompt: verbal commentary

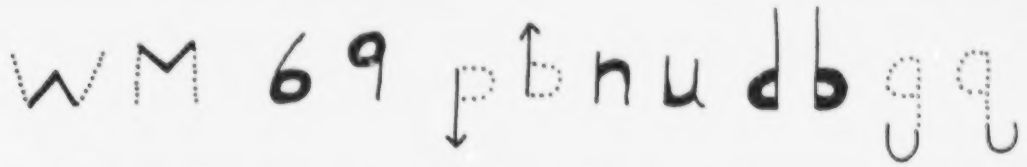
show prompt: visual aide or model

guide prompt: physical help, like student's hand on yours

DISTINCTIVE CHARACTERISTICS

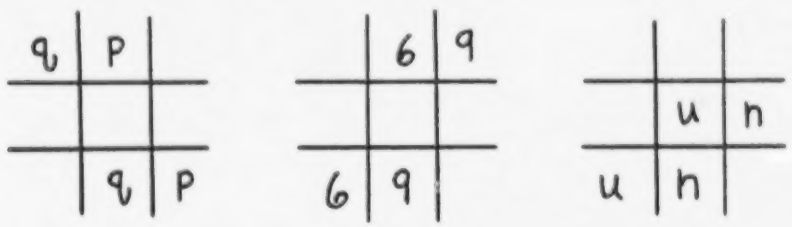
Principle: Highlighting major differences between easily confused letters, numbers, or words significantly aides in the student's ability to discriminate between them.

1. Distinctive characteristics can be emphasized by heavier or colored lines.[3] Or, less important characteristics can be minimized. Examples:



2. Daily review of distinctive differences between troublesome pairs of symbols. Student says out loud why they are different. Standard phrases (e.g., "It has a tail, a q"), or student's own description may be used.

3. Play "p/q" tic-tac-toe, or with any letters or numbers:

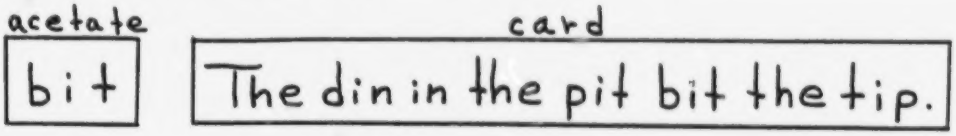


Use different colors for each letter or number at first.

4. Student scans newspapers or magazines and underlines in different colors all problem letters/numbers. Have student simultaneously say the rule (e.g., This is a b because it goes down, up, right and around), mention a distinctive feature (e.g., n, hill top), or cite an "anchor word" (e.g., u, up).

5. Print letter or number on acetate sheet and "error" on 3 x 5 card. Have student overlay the sheet on the card and tell how they are different. Can be used with words, too. Keep a teacher file of these for future use.

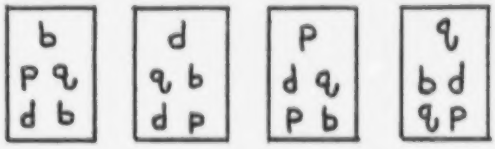
Alternate: type or print word on acetate sheet and have pupil match to the same words in a typed or printed sentence or paragraph. This should also contain some easily confused words. Example:



6. Use letter stamps and ink pads, sponge letters, or potato letters for stamping. Student practices stamping the troublesome letter or number. For words a variation is stamping each letter of the word a separate color. For example, for on and no the n would be blue and the o would be red (i.e., the order of letters is made distinctive). Keep in a "book" and review.

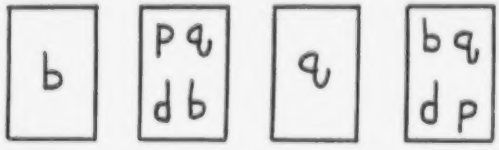
7. Distinctive feature training can be used.[4] Try these two types of exercises.

(a) A simultaneous approach utilizing a series of cards like these:



Student matches to the top sample by touching the like letter below.

(b) To train memory, a successive matching-to-sample approach is used:



Show first card for five seconds, turn over, and present second card. Gradually decrease the time first card is exposed. Give corrective feedback and verbal reinforcement for correct choices.

8. Write sentences containing many words with confused letters to give practice in judging the differences:[5]

(a) The boat was full of ducks.
(b) Eddy took a bit of a dip in the middle of the pond.
(c) The ant went up, on, and under.

VISUAL OR PICTURE AIDES

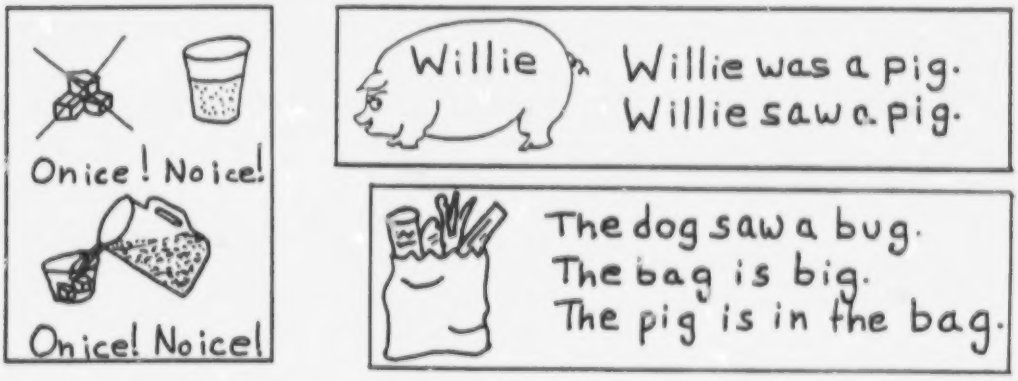
Principle: The student can see, in highlighted or pictorial terms, how the problem of concern is "special".

1. Cue a letter to call attention to it. Examples: b e d, b e d, b e d.

2. Put pictures of objects on the walls with the problem letters (or words) written under. The student then refers to the pictures to clarify any confusion. Examples: picture of dog, wagon, saw (to cut with), top etc.

3. Match letter or number using homemade "dominoes", perhaps quite oversize and played on the floor.[5] Fun and motivating. Examples:

4. Match sentences to pictures:[5]



5. Cut out letter or number. Color one side green. Turn over and color other side red.[6]

Example:

Student colors correct side of 4 green ("go") and incorrect side red ("stop"). This is kept at desk and matched to written 4's (i.e., if green 4 matches what is written it's OK.).

Example:

(a) Cut out b and color green, color d (other side) red;

(b) Teacher writes many first letter b and d words on board;

(c) Student copies these, checking correctness of first letter with colored cut-out, and names letter (e.g., "b, it's a green letter").

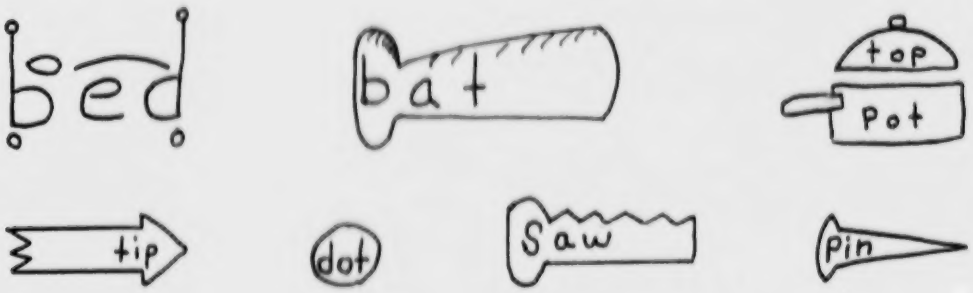
(d) Try with any confused letters (p/q, n/u, etc.)

6. For directional confusion, find stable reference points in the classroom. For example, window on the left of student's desk, clock on student's right. Ask, "Is it a window letter?" (points left), "Is it a clock letter?" (points right). If necessary tape visible letters (e.g., d on window, b on clock) on respective objects, or tape drawings of these objects on left and right of student's desk in addition.

7. Try a story line:[5]

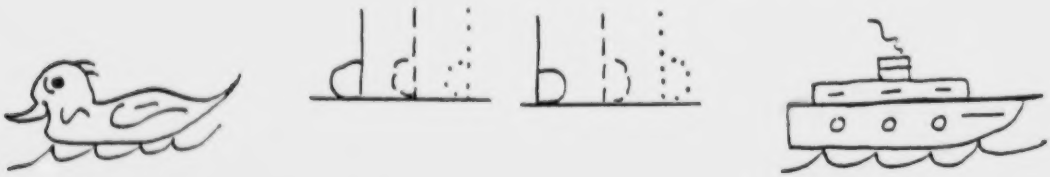
This is b
b is on the line
b is tall like a building
b looks to the right

8. Associate a word with a picture, or draw a word on an outline of its meaning:



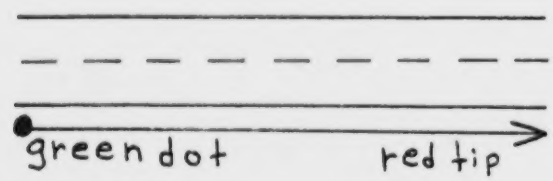
9. Use picture cues for direction orientation. For example:

The following example places the duck to the lower left of d and the boat to the lower right of b:

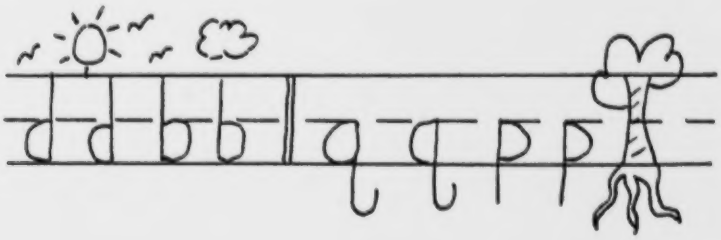


10. Many times reversals are related to left/right confusion on the page. Help to make orientation on the page obvious by:

- colored tape on left side of student's desk or student's location at reading table prompts starting point
- green tape on left means "go", red on right means "stop"
- green and red vertical lines on the blank page margins
- label blank page left and right on margins
- put green dots, stars, stickers on left edge of each writing line
- underline bottom writing lines or make reading markers like this:

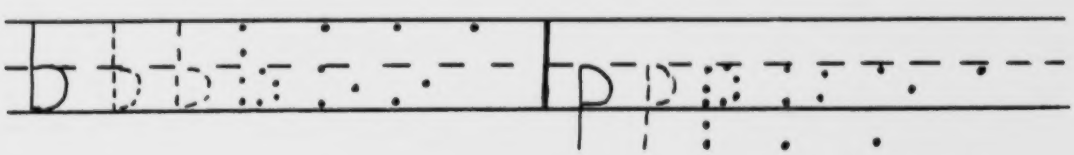


11. Root letters, sky letters.[6] Gives concrete reference points. Good for errors such as a d/q inversions. Make work sheets similar to this, or put this format on a card for student reference:



12. Student makes a "personal" design or picture with problem word, letter, or number. Transfer to 3 x 5 card to keep at desk for reference. Examples:

13. Make copyable work sheets like this for daily homework:



The idea illustrated is <u>fading</u>, or gradually deleting, the cue or prompt.

14. Writing letters or numbers on a clock face may help to illustrate directional characteristics. Formation rules can be devised, too, such as, "12 to 6, over to 3, and back-<u>b</u>."[18]

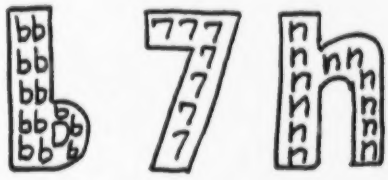
The middle example is but one idea to help make clear to the student special properties of easily confused letters:

- o d and b are "12 stem" letters
- o q and p are "6 stem" letters
- o d and q are "9 loop" letters
- o b and p are "3 loop" letters

15. Using an overhead projector, put an outline of problem letter or number on chalkboard. Student can practice on this model.

Next, have the student look at the projected outline and then write it when the overhead is turned off. Turn overhead back on for feedback.

16. Fill in a large outline of problem letter or number with smaller ones:



Begin this exercise by having the student make perfect letters or numbers with the aide of a template (i.e., errorless learning). End this exercise by having the student (a) fill in blank squares with the letters or numbers, (b) circle them in an array of jumbled symbols, and (c) write them from memory, without prompts.[7]

SORTING

Principle: Student sorts or categorizes troublesome letters, numbers or words into "groups", gaining understanding of consistency in the "groups" by distinctive characteristics. Key phrase is, "Put same with same". Synonym is, match-to-sample.

1. Using egg carton (or small cups) write the problem letters (e.g., b, d) on the bottom of the individual egg compartments. Student places a bean (for b) in the b compartments, or colored dots (for d) in the d compartments.

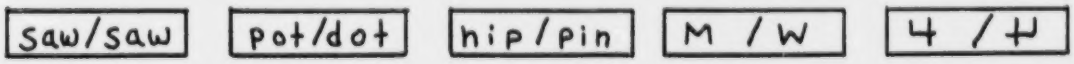
2. Cut out pictures which have first sound of problem letter, for example ball, balloon, duck, pod, whale. Glue on cards and write word below. Have students sort by sound of first letter.

3. Cut out b's, p's, m's w's, etc., and sort from a mixed pile into labeled containers. Color one side green to identify "top" of letter, and put a dark line to identify "bottom" of letter.

4. To assist with careful discrimination of words, use mixed upper and lower case letters. For example: WAS, WaS, WAs, wAS, was. Child must look closely at the word to determine the correct category. Add in cursive or italics for older students.[20]

5. Teacher uses a typewriter to type a mixed row of letters or numbers including many samples of problems. The child is instructed to circle the problem ones (e.g., all "b's", all "4's", etc.) or to circle some, underline others.

6. Make "same/different" cards. For example:



Student then looks, discriminates, says "same" or "different", then puts into "same" or "different" piles. Gradually increase the speed of card presentation and reward the student for improved rate.

7. Student has a template (i.e., clear overlay) on which is printed letters/words/numbers. Student is given many cards which are the same, similar, or very dissimilar to overlay, and is to match and sort into "like" or "unlike" piles. Student should verbalize why they are the same or different. For example, template is a b and cards are for b, d, p, g, q, x.

The use of such a template has been successfully used as a tool whereby learners can self-correct their letter or number formation: simply overlay and correct as needed.[10]

TACTILE-KINESTHETIC

Principle: For some students touching or finger tracing has been found to be a useful addition to seeing, saying and hearing for promoting learning. Action and motion can be reinforcing and enjoyable.

1. Reinforce motor patterns through repetition, train correct formation to be automatic. Fun and rewarding variations to "standard" repetition of reading or writing many times are to use finger paints, chocolate or marshmallow cream (a good homework assignment), letter cookies, etc. For the cookies: make, bake, sort, eat.

2. Always try to combine tactile/kinesthetic with auditory input.[11] For example, student finger traces and says, "Down, up, right around, it's a b! Or, student traces and says the letter name, finishing both at the same time.

3. Use action and rhyme:

"I put my head on the b (student touches left ear) and my feet on the d (student touches right ear)... bed.

"If this is a b (student makes "hook" with left thumb and pointer) and if this is a d (student makes "hook" with right hand), there now I see!" (student makes pretend eyeglasses).[6]

4. Reiterate problem letters or numbers as part of a known sequence, as "a, b, c, d", "4, 5, 6, 7", "The quick brown dog". Use "look and say" while touching or tracing problems and saying problems louder than others. Use rhythm.

5. Let the student practice forming or finger tracing the words, letters, or numbers they are having difficulty with by using sand or salt box, pipe cleaners, clay, fingerpaints, lacing board, cut-outs of sandpaper, glued yarn, beans, or glitter.

These procedures will be most effective if this sequence is followed:[1]

(1) Teacher names the letter, student forms or traces the letter and says the letter name.
(2) Teacher says the letter sound, student forms or traces and says the letter sound.
(3) Student listens to teacher say a word and then forms or traces first letter of that word and says the letter name.
(4) Student listens to teacher say a word and then forms or traces first letter of the word and says the letter sound (dog, pin fat); next, with another word, the last

sound (dip, pig, bus): next, with yet another word, after mastery on the first two exercises, the middle sound (one, rub).

(5) Student listens as teacher says a word and then forms or traces that word while spelling the word.

6. Have the student feel a letter (e.g., plastic, wood) without looking. Then the student does some or all of these:

- o correctly choose, from a group of three, that letter
- o name that letter
- o give the letter sound
- o give a word that starts with that letter
- o write this word

7. Trace problem letters or numbers on student's back or palm and ask student to identify them (without looking). Do more slowly if necessary, and gradually increase the speed. Try a dry or water-wet paint brush.

8. Make large cards with problem letters.[6] Helper pupil holds one up and target pupil says name, gives formation rule, "skywrites" the letter, and then walks towards and around helper in direction of key part of letter: b↰ ↱d. There are many variations: u, crawl under; n, kneel down.

9. Provide a simple cue, such as a rubber band on the wrist or a ring worn on a finger of the left hand. The "ring" in the d is on the same side as the ring hand, for example.

10. Have the pupil hold the reading book perpendicular for a 20 count in the writing hand when reversal occurs. Ask pupil if the letter faces towards or away from the heavy hand.

11. There is less tendency to make directional errors when doing chalk board work, or writing large. Demonstrate on chalk board proper letter/number formation using whole arm, instead of just hand action. Child then stands in front of the board and does the same. It is believed that "whole arm" writing accentuates proper formation and improves motor memory.

After mastery in writing this way shape skill to produce standard writing size and to improve fine motor control by giving student such training as:

(a) write large letters on 16 x 24 sheet
(b) fold this sheet to 8 x 12 and write letters 1/2 size
(c) fold this sheet to 4 x 6 and write letters 1/4 size

(d) fold this sheet to 2 x 3 and write letters 1/8 size
(e) write letters on standard size lines

12. Use the following examples to teach b and d. Say, "Here's how you can always know how to write these two letters". If necessary teach initially as part of the known sequence, a b c d. Second example can be reversed for p/q problems.

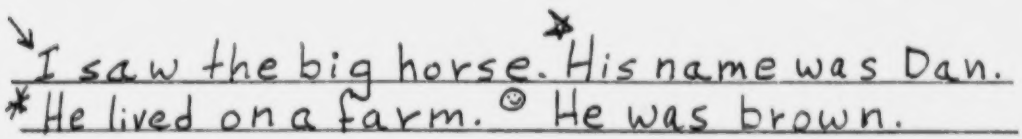
13. Walk-on letters or numbers: Put these on the floor and make out of tape, rope, fabric. They could be chalked out on blacktop or grass for out-of-class practice. For example, student walks and names four times just before recess, in correct formation sequence.

14. "Get Physical": In this exercise when children see a b they clap hands, and stamp feet for d. Use individual letter cards, mixed rows of letters, or text. Use for any problem letters or numbers (u-n, 6-9), to help with discrimination.

SEQUENCING: GETTING THE ORDER RIGHT

Principle: Left to right reading or writing may need to be trained if it does not happen automatically. Student may need daily pointing out of transposition errors, using concrete examples and visual aides. Always pair these with as much reinforcement of correct reading or writing as possible.

1. For children who tend to read or write right to left, or begin in the middle of the page, use "cue arrows" to demonstrate where to start reading or writing. Examples:



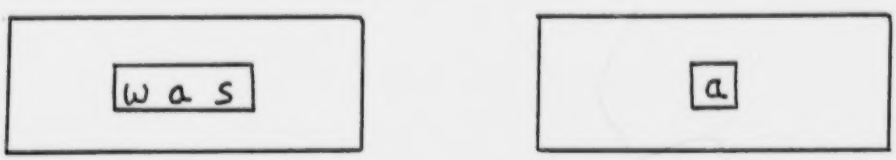
Variation: put star on student's left thumb and star on each sentence or writing line. Give command, "Thumb Star!"to cue where and when to start reading or writing.

2. Start writing at far left edge of paper, or the left thumb, put at extreme left of page, acts as an anchor.

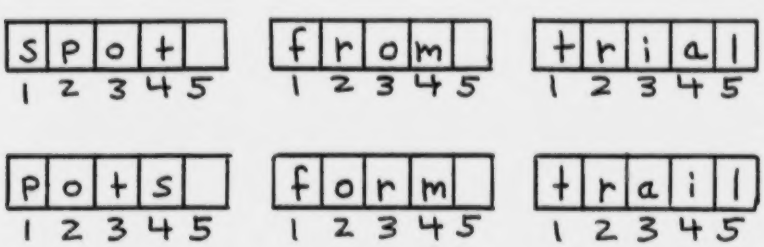
Option: Put vertical green line, dots, "stickers", along left margin of page.

Option: Slide left or right thumb left to right along page where reading or writing.

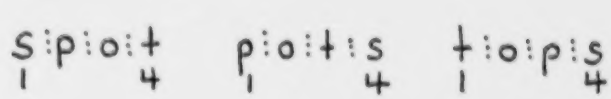
Option: Finger underline word, slowly at first, or use window marker. The are a variety of these:



3. Make squares on paper or large card and number them left to right. Write problem word one letter to a square:

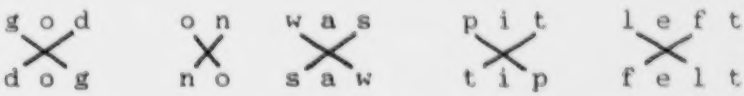


Then gradually "fade the cue":



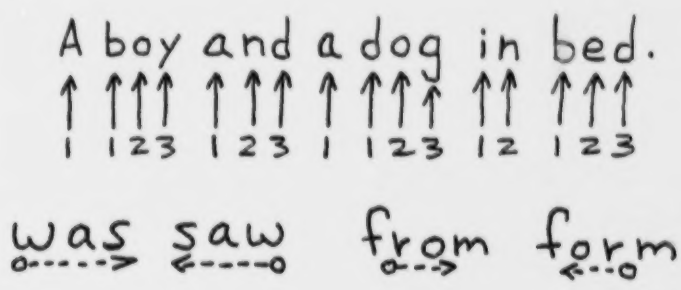
4. Student sits beside skilled peer and watches words being formed left to right. Peer may write "language experience" story ("bad dad hid by the ball").

5. Write word transposed above pair and have student draw lines to highlight differences:[12]



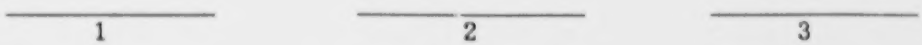
6. Write the transposed words side by side. Pupil numbers letters in first word, ditto in second:[12]

Or use arrows to highlight nature of error:



7. Student uses typewriter/computer to see word formed left to right. Perhaps start with letter-by-letter, then syllable-by-syllable, then word-by-word.

8. Develop a spelling game with the student. Using a mimeographed sheet (or on the chalkboard) put a format similar to the following:



Say, "I'm going to spell a word, but I'm going to give you the letters out of order." An example would be: "Letter #3 is a d, letter #2 is an a, and letter #1 is a b. Now what is the word? Tell me the word and spell it".[13]

9. Color code for contrast letters of transposed words, where r = red, etc.:

was - saw = r b g - g b r
who - how = r b g - b g r
on - no = r b - b r
spot - stop = r b g y - r y g b

10. Color code letters to teach direction.

Example: Green (left) = go, Red (right) = stop. Soon, just use a colored dot:

w	a	s		t	i	l	e		l	i	t	e
(g)		(r)		(g)			(r)		(g)			(r)
.		.		.			.		.			.

Keep a word file on 3 x 5 cards with first letter green, last letter red. Use black letters next to this, or on reversed side.

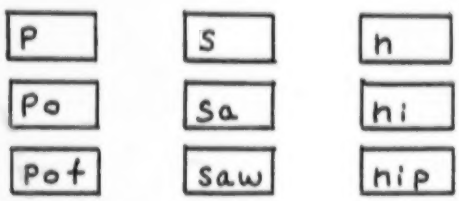
11. Try a fill-in exercise to train comprehension of sequence:

a	n	d		w		s			i	g		
a		d		w	a	s		p		g		
a	n			w	a				i	g		
		d			a			p	i	g		
a				w				p				

p	o	s	t									
		s	t									
			t									
	o											
p												

After mastery have student cover words above and fill in one below from memory.[1]

12. Sequence cards for words assist in developing a left to right orientation. Show one card at a time, and student reads all three cards Examples:



13. For commonly transposed words make up sentences with pair choices of the words. The student is to select the correct word from the pair. Examples: I (saw/was) walking by the store; The (pot/dot) is full of water; the (trap/part) had the mouse. Discuss why chosen word was correct/incorrect.

14. Teach the child to use verbal strategies to monitor the work. For example, if child writes, "I was a robin by the tree", ask the child to read it and say whether it makes sense.

15. A linguistic method is to tie into word families. Examples: rhyming words, saw, paw, jaw; "sa" words, saw, sat, sad; tools, saw, hammer, pliers.

16. Emphasize difference in meaning of transposed words, without context:

tired =	from =
tried =	form =

Use drawings, acted-out examples, peer descriptions as helps.

17. For commonly confused words, use sentences in which context clearly permits only one of the choices to be correct:

The dog was _____ the floor. (on - no)
The _____ slept in the barn. (pig - big)

18. Write in pairs words confused (was/saw, net/ten, trap/part). Use each in a separate sentence.

19. Name the first letter of each word in a sentence, then the second letter of each word, etc. Last, count the number of letters in each word in a sentence, then the number of words in the sentence.

BACK TO BASICS

Principle: Some pupils may profit from a reiteration of fundamentals, or a fresh beginning from basics.

1. The letters from easiest to most difficult to write have been judged to be:[14]

l, o, L, O, H, D, i, v, I, X, E, P, F, V, c, x, t, h, w, J, f, C, N, A, W, K, z, t, B, Q, s, n, Z, r, e, b, S, M, u, Y, d, R, G, a, V, k, m, j, y, p, g, q.

Teach from "l" to "q" in order, for writing. If possible avoid teaching together letters that look or sound alike, as for example:

Sound alike: p/b, k/g, t/v, sh/ch
Look alike: b/d, f/t, m/n
Can be inverted: m/w, u/n

2. Teach the importance of position by turning objects in various positions to demonstrate differences in appearance. Next use plastic or felt letters or numbers and point out that while objects "are the same" when turned, letters and numbers "are different"! Explain why.

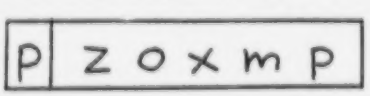
3. Talk to kindergarten teachers about ideas for training directionality, or for number or letter formation "tips".

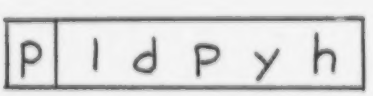
4. Primary students, in particular, may be aided by directionality training. If student shows a left/right confusion make page lessons with maps, "car trips", mazes or obstacle courses.

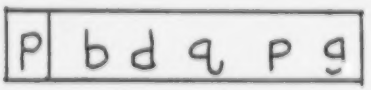
Another idea is to divide a page in half labeling one LEFT and the other RIGHT. Pupil cuts out from magazines pictures which point these directions and glues them in their respective columns.

Of course, such standards as "Hokey Pokey" are always practical: "Put your left foot in, put your left foot out..."

5. A visual discrimination program for problem letters or numbers may help. An excellent procedure is to begin with easy discriminations and gradually increase the difficulty. Training strips like these are not difficult to construct and can be used for years:[5]



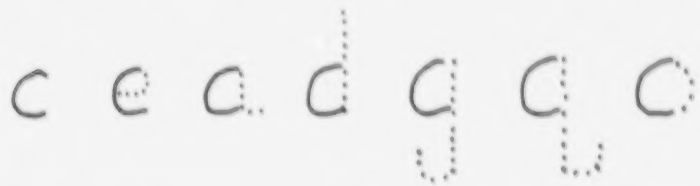




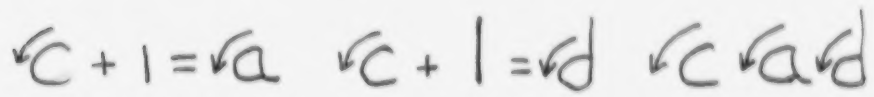
6. A preventative approach can be used with any easily confused letters or numbers. Example:[15]

(a) Separate teaching of d and b by a few weeks, and teach d first. Show: green → d.

- teach student to use left thumb and pointer to form c
- hold this position while reviewing the "seven c's" whereby a family of letters is made by adding strokes to c:

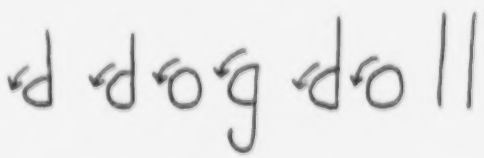


- build a close association between c, a, d:



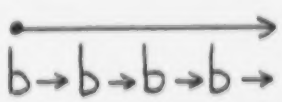
- have student repeat "c comes before d" as each letter is made; alternate in practice: cd cd cd
- associate a strong d sound with words as the letter d is taught and reviewed (avoid words containing b): d-dog, d-doll, d-did

  This "d-word association" can be made into a visual aide:

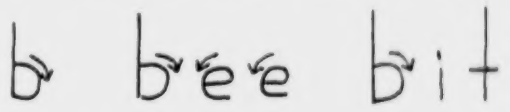


(b) Teach b second. Show: b ← red.

- have student repeat "b right" as each letter is made. Illustrate:



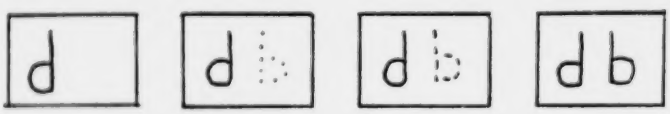
- o strengthen this association by alternating in writing l and b: lb lb lb
- o associate B with "little brother b", and alternate in writing: Bb Bb Bb, and then h with b: hb hb hb
- o quickly associate b with many b words using a strong sound b (avoid words containing d): b - big, b - bat, b-bee. Use the visual aide:

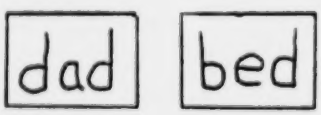


(c) Teach b and d together third. Use 3 x 5 cards.[8]

- o put d on several cards and have student identify the letter on each card
- o put d and a very faint b next to it on several more cards and have student identify each letter
- o on several more cards put d and b and increase the darkness of the b slightly
- o on the last cards have d and b of equal darkness and have the student identify each without error
- o put many words containing d and b on cards and have student identify the letters

Example:





(d) Elimination of a b/d problem in writing should spill over to reading and help with such errors as: dog/bog, ball/doll.

MISCELLANEOUS

Here are listed a potpourri of various remedial procedures.

1. Flash cards for problem words, letters, or numbers, used as daily homework. Require at least four correct responses in a row. After this review twice a week.

2. Write "problems" on 3 x 5 cards. Keep a file in box and review daily to mastery. "Overlearn" by periodic review. Alternate peer tutors as aides.

3. Student is given a troublesome word or letter on a card at desk. Student studies it, and when ready walks to the chalkboard and writes it. Student returns to desk and checks the correctness of the word.

4. "Magic Trick": When student errors, say "magic trick" to cue awareness of mistake. Use humor. Perhaps pass to student "magic hat" or "magic wand".

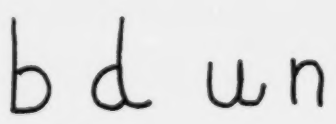
5. Children can be creative in offering solutions to their learning problems. Ask them for ideas and suggestions. For example, one student said of d, "d has its stomach in its back".

6. Try a memory device such as, "Always b right!" Also functions as a self-command: m middle down!, b-right!

7. Unclutter the format, to assist in bringing clarity to the material. For example: Enlarged photocopying of printed material, less cluttered page, wider line-guide paper or use of a window marker.

Another example is to "space" presentations. Say letters that sound alike (t/d) more slowly and with a longer pause between, write letters that look alike (t/f) farther apart, and do both for letters that look and sound alike (p/b).

8. Allow child to use cursive (or D'Niellian) for those letters/words presenting difficulties. Or, teach cursive early. Cursive letters (a) move easily from left to right, and (b) are less easily confused than manuscript letters. Another option is to teach capitals first, or only for problem letters. Or, teach easily confused letters with slight differences, such as:



9. Have student monitor own writing errors.[6] Say, "Erasing takes too long and can tear up your paper." Instead:

Jane was saw a car. (underline error)
Jane (was) saw a car. (parenthesis)
Jane ~~was~~ saw a car. (light line)

This procedure also helps teacher keep track of errors.

10. Many fun activities can be used for remediation and motivation.

One is "Carwash". Teacher draws a car on the blackboard. Next to it she writes many (digits, letters) words which are causing difficulty. Teacher calls out a word on the board, student then comes up and erases the correct word and one part of the car. Similar to "hangman".

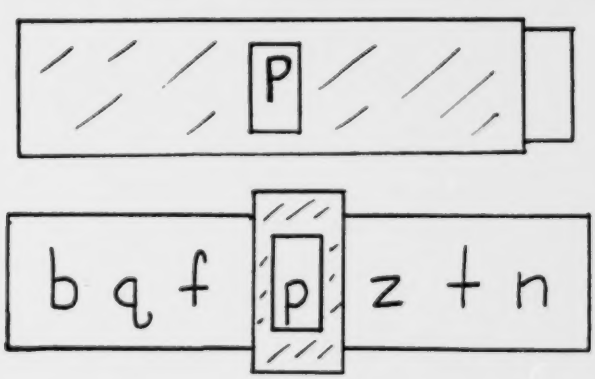
Another is "Fish". Student "fishes" with string and magnet a card with a paper clip attached. Problem letter, word, or number is written on card. If said correctly, a student-chosen reward is given after "x" number of "fish" are caught. Gradually increase the number of "fish" caught to earn the reward.

11. Make cards for commonly reversed letters, one to a card. Have the student write it "backward" (e.g., b for d or u for n). Then have the student say the name of the letter and the "backward" letter. **This helps to identify the "backward" letter, and the difference between the two.**

12. Purposely misprint words containing the problem letter (e.g., finb, tup) and ask student if it looks right or wrong, and if it is a "real" word.

13. Use a window marker moved past rows of mixed letters or numbers. These would contain all problem letters or numbers as well as many that are not problems. Make several rows, practice daily, and gradually increase speed. This improves quick discrimination between easily confused letters or numbers, much as would be needed in actual reading or writing.

Examples:



14. Match phrases to sentences: [5]

big pig The big dog is in the yard.

big dog The big pig is in the yard.

top pot The pot top was in the sink.

pot top The top pot was easy to reach.

V. MODERN LETTER FORMATION STRATEGIES

These Key Elements can serve as a practical checklist for writing improvement:[14]

Modeling: The teacher writes the letter and names it. The student observes the number, order, and directions of the strokes.

Noting critical attributes: The teacher compares and contrasts the stimulus letter with letters that share common formational characteristics.

Physical prompts and Visual cues: The teacher physically directs the student's hand in forming the letter. Additionally, the direction and order of strokes can be guided through use of arrows or colored dots outlining the letter shapes.

Tracing: The student forms the letter by tracing dot to dot patterns, dashed letters, a faded model, raised letters, or an outline.

Copying: The student copies the letter on a piece of paper or in wet sand (calling upon the tactile sense). Generally more effective than tracing.

Self-verbalization: The student verbalizes the steps as the letter is written (using the auditory mode).

Writing from memory: The student writes the letter without the aid of cues.

Self-correction and feedback: The student corrects malformed letters with the assistance of a visual aid (e.g., desk or wall alphabet charts) or under the teacher's direction. Progress graphing or charting allows student and teacher "at a glance" understanding of progress.

Repetition: The student practices forming the letter through concentrated multi-sensory drills.

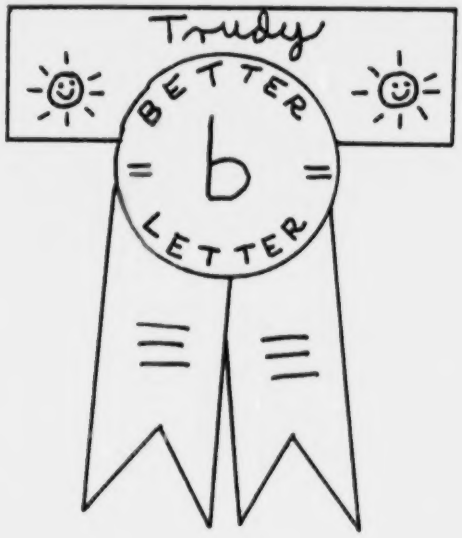
Reinforcement: The teacher praises the student or gives other reinforcers for correct letter formation.

Most Important

Of these key elements it is crucial to always have a substantial positive reinforcement aspect to the remedial program. This is the source of student motivation and is necessary for writing improvement.

When the student does well, or shows improvement, consider:

- o verbal praise
- o post the work
- o award for "the best"
- o earn free time
- o share-and-tell
- o show to principal
- o add to sticker chart
- o positive note home



Research and practical experience indicates that a combination of several key elements are superior to one alone.

A remedial plan for writing errors might be packaged as follows:

- o an advanced organizer is given: the purpose for the the lesson
- o teacher models formation of letter
- o teacher and student discuss the formation act, student asks questions
- o student names the letter
- o letter is traced with finger, pencil, magic marker
- o student finger traces letter made of glued yarn, next a heavy crayon letter
- o teacher uses VAKT/multi-sensory stimulation (student looks, listens, says, touches, moves through formation act)
- o student traces a dotted representation of the letter many times
- o student copies and names the letter
- o teacher examines the letter and, if necessary, corrects by overwriting with a highlighter; student makes letter conform to this by erasing and recopying
- o student vocalizes the formation rule while writing
- o student tries to visualize the letter as another student describes it
- o student writes the letter from memory
- o student compares written letter to a model and corrects as necessary
- o to maintain mastery student uses this routine: look-say-trace-cover-write-check-correct.

Each step is repeated as many times as necessary.

Each step requires the use of a strategic student reinforcement component. Always praise or otherwise reward student's correct, or improved letters.

Each step could be used with numbers or words, too.

This is an excellent procedure for parents to use at home.

VI. SEVERAL EXAMPLES FROM APPLIED BEHAVIOR ANALYSIS

(1) Model-Lead-Test

Principle: A systematic, step-by-step, student feedback oriented method. Emphasizes correct procedure. [16]

Error: Student reads pig for big, in small reading group.

Example: Follow the outlined sequence each time an error occurs.

PEER MODEL AND PRAISE. Allow another student to read word correctly, and give praise ("Good reading, Joe").

or

LIMITED MODEL. Give correct response for part of word ("This says b").

or

MODEL. Give correct response ("This word is big").

LEAD. As you point to the letter ask, "What sound?" Or, as you point to the word ask, "What word?"

TEST. This is student's response. If incorrect repeat above sequence. If correct give...

FEEDBACK/PRAISE. For example, "Yes, the sound is b. Good remembering!" Then go to...

DELAYED TEST. Some time later use (a) or (b):

(a) Test target word (big), or word part (b).
(b) Have student read from text several words, including a few times the problem word (i.e., big).

Recycle as necessary. Very effective technique if used consistently, each time an error is made.

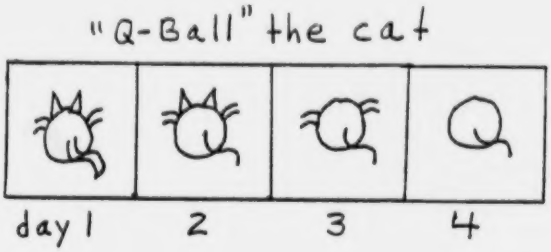
This is an excellent plan to teach parents to use during home reading (or writing). Easy and they like the success it brings!

(2) Stimulus Fading

Principle: Visual or other cues (prompts) are gradually withdrawn as aids.

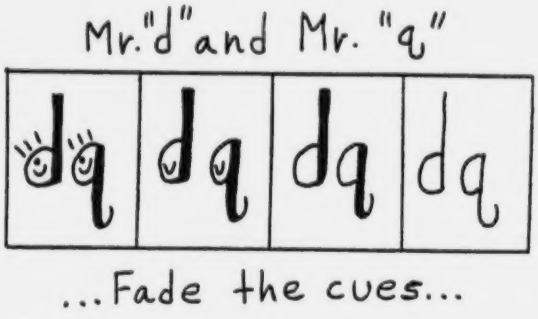
Error: Student writes O for Q.

Example: Teach "Q-ball the cat", as follows, and fade key feature cues:[17]



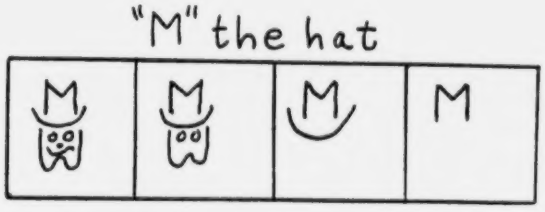
Error: Student writes q for d.

Example: Emphasize key features by color, larger lines, etc, and fade cues over time:[17]



Error: Student reads W for M.

Example: Teach "M-the-hat", as follows, and fade cues:



Error: Student writes P for 9.

Example: Say, "Nine is a number and faces left".
Say, "Nine, number, left".
Say, "Nine, left".
Say, "N, L".

Prompt or cue: an addition to the letter or number which helps the student make the correct response.

Guidelines for using prompts:

(a) the prompt should focus the student's attention on a distinctive characteristic, and not detract from this
(b) the prompt should be just enough to get the message across
(c) the prompt may be best ordered, in terms of what to try first, by: visual, verbal, model, phsyical guidance
(d) the prompt is only temporary and should be "faded", or gradually and quickly withdrawn, as soon as possible

Descriptive phrases are:

-"decreasing assistance"
-"graduated guidance"

(3) Modeling

Principle: Students learn from observing someone else produce correct response. When someone else is observed as rewarded for the correct response, or when this person is liked, modeling is even more effective.

Error: Student reads tan for ant.

Example: Put word on board (ant). Several times a day teacher gains student's attention and requests another student to read this word correctly, and then to use the word in a sentence. This student is praised ("Yes, the word is ant, good reading!"). Then ask "target" student to read the word, next in a sentence, and give praise as well.

Error: Student writes 6 for 9.

Example: Select several examples of correctly written 9's. Praise individual students, and have one write 9 on board. Have target student copy this several times at desk and once on board. Give praise to the student and use student's example as correct formation for class ("This is how we make our 9's. Good writing Linda!")

Error: Student writes u for n:

Example: A useful strategy is, praise, imitation, and model. It has a three-step format, and an option.[20]

(a) Teacher continuously praises the student for correctly written letters ("Mandy, that's the best n I've seen all day!")

(b) When the student makes an error, the teacher says, "No, that's wrong", and writes an exact copy of the student's incorrect letter next to the error (i.e., u).

(c) The teacher then models the correct letter form and the student copies this model.

(d) Option: The teacher erases the error, and says, "Here's what you wrote", and rewrites the error. The incorrect letter is highlighted, for example by putting a box around it. Teacher next says, "Here's the right way", and provides the model. Student then copies this model and is praised for correct writing.

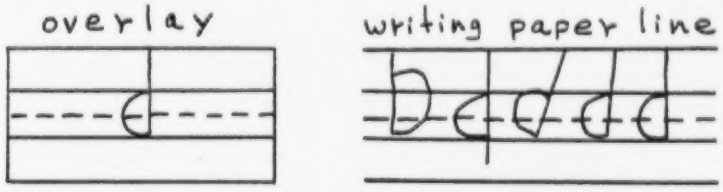
Note: The purpose of this exercise is not to over-emphasize the error, but simply to point out to the student that an error has been made, the nature of it, and how the letter should be made.

(4) Successive Approximation

Principle: Student gradually matches written letter or number to a precise model. The process of "getting closer and closer" reinforces correct formation.

Error: Student writes b tilted or malformed.

Example: Use acetate overlay of letter. Student compares written letter to model each time until perfect. Student then writes letter correctly four times. It might work like this:



This is an example of a shaping procedure.
Successive approximations to the correct letter are reinforced. The key is, "ever increasing similarity to the model".

Use these helps for bringing the student's writing gradually closer to acceptable:

(1) Provide a clear model of the perfect letter.
(2) Start the training with the student's best letter, whatever that may be.
(3) Arrange lessons so that the student will succeed in making better letters each practice. The ratio of success should be high.
(4) Emphasize success towards the goal; withhold comment on letters that are not better than previously written.
(5) Use "double praise" for the better letters (Example: Single praise, "Not bad", Double praise, "Super fantastic!").
(6) If the student does not make better letters simply say, "Let's try another one".

Example: After daily letter writing practice student chooses and circles best letter. Student tells why it was chosen. On Friday student chooses best of the previous five, also telling why, and puts in "Letter of the Week" frame, with award for "THE VERY BEST!" Display in classroom, take home.

Example: Student sets a goal: "My goal today is to make the best d". After writing practice student labels top three letters "good", "better", "best". The "best" letter is copied into a scrapbook labled, "I make better letters every day!"

(5) Self-Instruction

Principle: When student talks through an activity, student reviews skill steps independently, and can self-guide through the process.[9]

Format

1. Adult or peer model performs task while saying task out loud. Student watches, listens, and asks questions.

2. Student performs task as directed by adult or peer model and is praised for correct performance.

3. Student performs task and says task steps out loud.

4. When mastery occurs, student performs task and whispers task steps.

5. Student performs task steps and uses "private speech" (silent speech) to review task steps.

Example:

"What is it I have to do?"
"I have to make a b".
"I have to go down, up, right around".
"Is it right?"
"No, That's not right, I'll try again".
"There, that's right".
"I made a good letter!"
"I did a good job!"

Fade sequence to a whisper as soon as possible

Note: Always have student

(1) evaluate product
(2) ask for assistance if necessary
(3) say (out loud, whisper, silently) positive comments when task is correctly completed

Effectiveness of self-instruction is enhanced when:

(1) implemented during actual writing
(2) task is in student's skill repertoire
(3) student is reinforced for sticking to plan
(4) self-instructions are concrete and specific

Self-instruction is a central component in the Self-Guided Symbol Formation Strategy.[21]

This strategy uses this teaching sequence:

1. Teacher models correct letter formation while student observes.

2. Teacher gives the formation rule and student says this in unison with the teacher.

3. Student traces the letter on a model (e.g., glued yarn) while saying the formation rule in unison, continuing until student can say the rule alone.

4. Student self-instructs, as discussed above, making sure to (a) define the task, (b) verbally direct the motion, (c) correct errors as they occur, (d) self-reinforce.

5. Student self-instructs and writes letter on blank page. Self-instruction is faded to silent speech.

6. This is repeated until student can make a good letter three times without overt self-verbalization.

7. Teacher verbally describes formation of letter while student attempts to visualize the letter and how to write it.

8. Mastery: student writes letter five times from memory.

9. Student begins to use letter in words, phrases, sentences.

(6) Overlearning

Principle: The degree of original learning is the most important factor in long term memory. Overlearning helps to maintain original learning. This is done by continued teaching and practice after the student has mastered the task.

Error: Student's previous teacher has commented that student learns well but tends to forget easily. Student had learned 6 correctly but now is inverting again (writes 9 for 6)!

Example: Teach student 6 once more to mastery. Then use the same teaching methods several more times (i.e., overlearning).

For example, review with the student the formation rule for 6, model the correct procedure, use visual aides, and have the student trace and copy accurately several times. Continuously reinforce good written 6's.

Continue this training for several more days even though student can accurately make 6's from memory.

Maintain mastery by periodic review or maintenance probes. If these indicate a decline in mastery, repeat overlearning procedure and use distributed practice.

Periodic review: scheduled review sessions, once a week at first.

Maintenance probes: quick checks on skill every now and then, every day or so at first.

Distributed practice: practice of skill in short sessions over time.

(7) Generalization

Principle: Generalization refers to the transfer of the student's ability to exercise the learned skill to settings different from that where the original learning occurred.

Error: Student confuses b and d in reading and writing. Review of letter formation with single letters has not been successful.

Example: Generalization of the learned skill from single letters to words, or to letters in various positions in words, may need to be trained. The following procedures has proven successful. [22]

(1) Write dam on a 3 x 5 card and have student trace, name and write. Put bam on a 3 x 5 card and point out that bam was often read and written like dam. Student traces,names, and writes d again.

(2) Create several word lists of CVC words which have b and d in initial and final positions. Vary middle vowels:

bud, bun, tub...
bid, jib, rig...
bad, fog, dig...

(3) Using a different list each day have student write it from dictation, and then read. Repeat step #1 each time a reversal error occurs.

(4) After three days of 100% mastery on the CVC lists, introduce mono- and polysyllabic word lists, and follow the same procedure:

dab, ball, band...
danger, bible, period...

Some suggestions for facilitating generalization are:

- o make sure student has an opportunity to exercise the skill each day - this maintains skill proficiency and provides instances where correct performance can be reinforced
- o verbally praise, or otherwise give positive reenforcement ("Warm Fuzzies"), several times each day for correct reading or writing
- o try to choose a different context each time (examples: paragraph reading, handwriting practice, journal entries)

- o use text or written paragraphs for training as soon as possible - for example have student say a letter formation rule and name a distinctive characteristic while looking at the problem letter in a reader

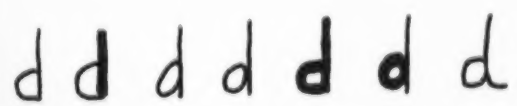
- o enlist others to praise student's good reading or writing (examples: peer volunteer, parent, principal) - teach them to use behavior specific praise: name the letter and add praise statement ("That's a b, you're reading it right!", "You wrote this b in the right direction, you are improving!")

Example: Generalization can be promoted by concept formation letter learning. This procedure uses multiple examples of (a) the letter, with slight variations, to show "sameness" (positive examples), and (b) other letters, which become increasingly similar to this letter, to show "difference" (negative examples). This helps the learner make up a rule characterizing the letter, and as well how it is different from similar ones.

To illustrate this idea, the following teaching sequence is based on an eleven step format.

(1) The first step uses two features of d (thick and thin) and highly disimilar negatives (boat and scissors).

(2) Next, to show how different d's can look while retaining "d-ness", substitute seven d's like these:



(3) Third, for the boat and scissors substitute a letter with a highly similar shape: a

(4) Then substitute for these one with a highly similar sound: t

(5) Next substitute one with similarity in feature and sound: p

(6) Last, substitute the reversal pair: b

In summary: Generalization is made easier, and reversal tendencies are weakened, when the student has a strong concept/understanding of a letter. This can be encouraged by training which utilizes both (a) examples of feature variation within the letter, and for contrast, (b) examples of other letters which are made increasingly similar to the target.

This eleven step format is a sample. In practice, considerable expansion and variation are possible. All would utilize (a) a carefully staged teaching sequence, and after student success, (b) would gradually increase the difficulty of the task.[26]

Example	Teacher Wording
1 d	This is d.
2 d	This is d.
3 d	What is this?
4 d	What is this?
5	What is this?
6 d	What is this?
7	What is this?
8	What is this?
9 d	What is this?
10	What is this?
11 d	What is this?

(8) Positive Reinforcement

Principle: A reinforcer is simply something that occurs after a student behavior which increases the probability that that behavior will occur again. It "reinforces", or strengthens, that behavior.

In terms of reversal errors, this means that correct (not reversed) reading or writing will be more likely to occur on the next occasion if the previous one has been reinforced. Much more likely, in fact, than if reinforcement was absent.

Specifically, contingent teacher attention is a reliable and effective reinforcer. This type of social reinforcement is: (a) expression: winking, smiling; (b) contact: back pat, shake hand; (c) proximity: sit next to student, call to board; (d) privileges: choose to run errands, lead flag salute; (e) words and phrases: Way to go! This one is much better, Groovy!

Especially when the student is learning a new skill (i.e., not reversed reading or writing) many daily opportunities should be taken to reinforce correct skill use in the ways mentioned. Keep a daily tally of the number of times this is done to make sure it is sufficient.

The details of reinforcement use are available,[9, 23] but these are important considerations:

1. Direct verbal praise towards specific student behaviors, and name that behavior in the praise statement.
2. Monitor your attention to the student for genuineness and enthusiasm.
3. Avoid "flooding" the student with attention, and move to an intermittent schedule (every now and then) as soon as possible.
4. Praise the student immediately, or as soon as possible, after correct reading or writing.
5. Vary the types of attention used; novelty creates expectation.
6. Occasionally ask the student why the praise occurred.
7. Use the student's response as an index for whether the chosen attention method is, indeed, effective for that student. Contingent teacher attention works best with an:

Effective reinforcer: characterized by less reversal errors over time.
Affirmative reinforcer: characterized by such words as,"good", "fine".
Informative reinforcer: characterized by such words as, "right", "correct".

Error: Student transposes numbers when adding (e.g., 21 for 12).

Example: Use your attention to the student as a reinforcement for correct number writing. Withhold this attention (ignore) for incorrect responses.[24]

- First mark all correct numbers with a "C", and reversed numbers with an "X".
- For the "X's" say, "This one is incorrect. You see you reversed the number".
- Give extra help with the "X's": Use counters, number lines, modeled examples.
- Continue this procedure until it is clear that student understands the nature of the error, and how to produce the correct response (i.e., error is not based on a skill deficit).
- Next, mark all reversals with "X", but do not further comment on them or engage with the student in <u>any</u> <u>way</u> regarding the errors.
- Concurrently, give correctly written numbers a "C", and further reinforce them with a smile or a pat, along with such praise comments as, "This one is very good!"

This <u>planned</u> <u>praise</u>/<u>planned</u> <u>ignoring</u> procedure is a good choice to use when student continues to reverse despite reasonable training and feedback regarding errors or when the errors are careless or random. For ignoring use these rules:

- look away
- no verbal interchange
- impassive facial expression
- move away from student
- do these within 5 seconds

Error: Student reverses and inverts several letters when reading.

Example: DRL means <u>differential reinforcement of lower rates</u>. The essence of this procedure is that the learner is rewarded for making less errors, gradually, from a standard or baseline.

On a 3 x 5 card, carried for the purpose, the teacher makes a tally mark each time learner makes a reversal error. These are added by the learner, daily, and charted. Use <u>green</u>.

On the fifth day the learner computes the average number of errors for the week and charts this, too. Use red.

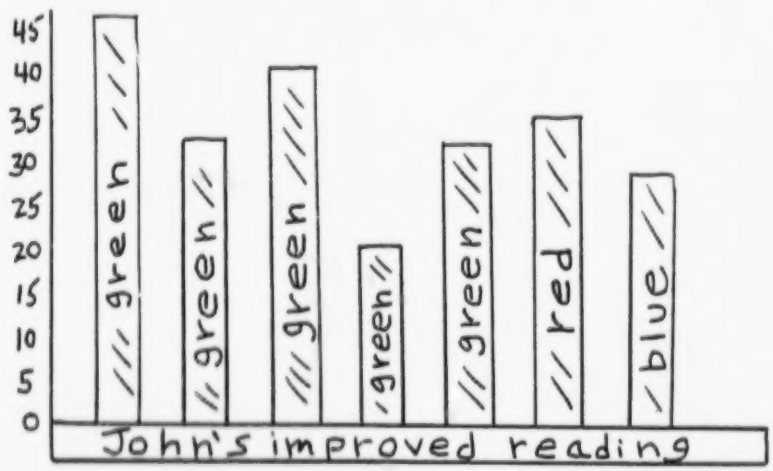
Teacher and learner then discuss the nature of the errors made, and the circumstances. The two then mutually set a lower "red" goal for the next week. Use blue.

A list of student preferred rewards is created. Student can choose one from the list if the weekly goal is met. Possibilities:

Class	Home
10 min. free time daily	Friend of choice overnight
Class office messenger	Pizza out anywhere
Daily game of choice with peer	Saturday movie
Colored pencil set	Evening popcorn
	New shoes

Last, create a weekly goal slogan:

Go Big Blue!, Blaster Blue!, Blue is True! Write this on next week's chart.



When setting up this DRL consider:

(1) It would be best to have a daily reward component in addition to the weekly. For example, student chooses from a list of daily rewards each day the average of two days meets or is lower than "blue". These would be of relatively less value than the weekly.

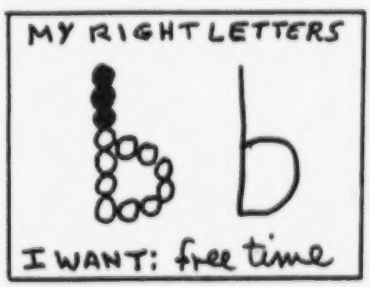
(2) If student agrees, post the graph on bulletin board - extra incentive can come from public display.

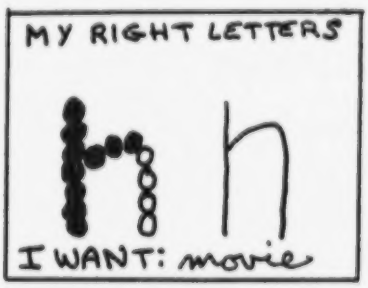
(3) Include an on-going feedback and praise component whereby instances of correct reading are immediately recognized and reinforced. Use these rules:

- look at student
- be within 3 feet if possible
- use a non-verbal/gesture of approval
- cite correct behavior
- praise this behavior (not the child)
- do these within 5 seconds

Example: A token system may be used. The advantage is immediate reinforcement of correct reading. The tokens (like small plastic counters, or paper squares) are exchangeable later for "back-up" reinforcers. One plan is as follows:

(a) for every correctly read "problem" letter a token is given, immediately
(b) on 3 x 5 cards draw "problem" letters with fill-in circles
(c) for each token received student is allowed to fill in one circle
(d) when all circles are completed the card becomes "legal" and the student can exchange it, or a certain number of cards, for a "back up" reinforcer on the list of student preferred rewards ("I want")
(e) at first, make it easy for student to earn a reward, for example by using prompts
(f) as student gains competence "up the ante" by, for example, requiring two tokens per circle, or by drawing two letters per card





REMINDER

Positive reinforcement is the single most important aspect of remediating reversal errors. However it might be done, always have this as a component of the training.

(9) Positive-Practice Overcorrection*

Principle: Extra effort and practice reduce tendency to error and increase probability of correct response. Error is not only corrected and practiced the right way (positive practice), in addition student must put forth extra effort on related topics (overcorrection). Always point out that the procedure has been found to help pupils learn better, and is not intended to be a punishment.

Error: Student writes n for u.

Examples using positive practice alone:

(a) When a reversal occurs student immediately writes letter correctly twenty times.

(b) When a reversal occurs student is given letter practice worksheet stapled to writing page.

Error: Student spells revel for level.

Example using positive practice and overcorrection:

(1) Orally spell word correctly.
(2) Write word correctly ten times.
(3) Part of speech is given.
(4) Complete dictionary definition is written out.
(5) Five original sentences with word spelled correctly are produced.

These procedures will work best when: [25]

-other skill deficits (such as handwriting) do not interfere
-student can independently maintain volume of work assigned
-student agrees procedure may help with problem
-they are used with positive reinforcement as a "package"

*Note: This procedure is a mild punishment approach. Best to try positive approaches first.

VII. COMMON ERROR PROFILE (CEP)

This method can be used when errors persist, and with upper elementary or junior high students.[27]

Focus: Identification, self-remediation, compensation.

Plan: Each student is given own CEP after teacher and student mutually analyze work samples (reading, spelling, writing, math). CEP lists all common errors. It may be put on 3 x 5 cards, or kept in a folder.

COMMON ERROR PROFILE	
CORRECT	INCORRECT
b	d
WAS	ƧAW
in the night	night the in
Does what you write make sense?	

Discuss characteristics of errors made. CEP familiarizes students with the particular kinds of errors they are prone to make.

Tell student it's OK to make errors as long as student works to recognize and correct them.

Isolate circumstances under which errors tend to occur: working too fast, stress or pressure, distractions, special time of day, content area, tests, large group setting.

Modify student work habits, work environment, or work attitudes to reduce likelihood of errors.

CONCLUSION

This report has presented a wide variety of solutions to reversal errors. Both traditional and more modern approaches have been included. All have been carefully screened to have a firm basis in educational practice, strong research support, or both.

The techniques are easy to use, require only readily available and inexpensive materials, and are not time consuming if applied in short sessions daily.

The idea is promoted that success is more likely if a "package " approach is taken. For example, a teacher might concurrently employ:

- o "errorless learning" letter practice using a template
- o a letter model printed on a clear acetate overlay for instant feedback
- o "p/q" tic-tac-toe for discrimination training and fun
- o a "clock letter" taped to student's desk for orientation reference
- o fading a visual prompt using "Mr. d"
- o bulletin board "public display" of best writing
- o systematic application of behavior specific praise

Whatever "package" is used, it is recommended that a consistent, systematic positive reinforcement procedure always be an integral part. This is promoted as the heart of the remedial plan, as it creates self-confidence, motivation to improve performance, and an opportunity to share pride in success.

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Note: A large number of the ideas presented here are "public domain". They have been in use for years by classroom teachers and educational specialists. Sources were: word-of-mouth, lecture notes, inservice handouts. Several others were created for this report.

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